We claim:

1. A membrane battery vent, comprising a battery case, at least one perforation in the battery case, a hydrogen gas selective permeable membrane integral, and a porous substrate adjacent the perforation in the battery case for venting batteries.

2. The membrane of claim 1, wherein the membrane passes hydrogen gas preferentially over other gases.

3. The membrane of claim 1, wherein the membrane passes hydrogen gas preferentially over other gases of water, carbon dioxide, and oxygen.

4. The membrane of claim 1, further comprising a catalytic layer and a dispersive layer on the membrane for acting as a gas recombination mechanism of gases evolved from within the battery case.

5. The membrane of claim 4, further comprising a catalytic surface on both sides of the membrane for acting as a gas recombination mechanism of gases evolved from within the battery case.

6. The membrane of claim 1, wherein the membrane further comprises a catalytic surface from catalysts metals from the transition metal elements, one or more components of platinum, palladium, nickel, copper, silver, chromium, molybdenum, tungsten, cobalt, iron, ruthenium, titanium, zirconium, vanadium, niobium, tantalum, or be alloyed with elements such as carbon, silicon and tin for acting as a gas recombination mechanism of

the gases hydrogen and oxygen evolved from within the battery case.

7. The membrane of claim 1, wherein the membrane is formed by coating a porous substrate.

8. The membrane of claim 1, wherein the membrane is formed by coating a porous substrate with selectively permeable materials.

9. The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate of etched nuclear particle track dielectric films with selectively permeable materials.

10. The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate, porous plastics, porous metals, porous glasses, porous ceramics, or porous semiconductors, with selectively permeable materials.

11. The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate, etched nuclear particle track dielectric films of polycarbonate plastic, polyester, polyimide, or polypropylene, with selectively permeable materials.

12. The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a substrate, of porous polyethylene, porous polyethersulfone, with selectively permeable materials.

13. The membrane of claim 1, wherein the membrane is formed by coating a porous substrate with selectively hydrogen

permeable materials selected from the transition metals, transition metal compounds or alloys.

14. The membrane of claim 1, wherein the membrane is formed by coating a porous substrate with vacuum deposited selectively permeable materials of Pt, Pd and its alloys, Pd/Ag alloy, Pd/Cu alloy, Ti/Ni alloy, AB_2 (e.g. $ZrMn_2$) or AB_5 (e.g. $LaNi_5$) coatings, La, Ti, Zr, V, Nb, Ta, Cr, Mo, W, Fe, Ru, or Co.

15. The membrane of claim 1, wherein the membrane has a gas permeable coating on it.

16. The membrane of claim 1, wherein the membrane further comprises a gas permeable coating of silicone rubber, polyvinyl chloride, polyethylene, fluorosilicone, nitrile silicone, natural rubber, polytetrafluroethylene, polymer electrolytes, or perfluorosulfonic acid.

17. The membrane of claim 1, wherein the membrane further comprises electrolytes in contact with selective permeable films for electrochemical catalysis of hydrogen, or oxygen or catalytic promotion of hydrogen oxygen recombination.

18. The membrane of claim 1, wherein the membrane further comprises a gas permeable coating of electrolytes in contact with selective permeable films for electrochemical catalysis of hydrogen, or oxygen or catalytic promotion of hydrogen oxygen recombination also provides a diffusion layer for limiting recombination to a surface of catalysts or rate of recombination.

19. The membrane of claim 1, wherein the membrane further comprises a non-selective gas permeable coating and hydrogen

selectively permeable coating coated over a non-selective gas permeable coating.

20. The membrane of claim 1, wherein the membrane further comprises diffusion gas mats placed on the membrane.

21. The membrane of claim 1, further comprising a seal for sealing the membrane to the battery case and for diffusing gas through the perforation in the battery case.

22. The membrane of claim 21, wherein the seal is provided with a heat or pressure stamp at least partially around the perforation in the battery case.

23. The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of a porous substrate, thereby forming a porous membrane, and further comprising layers of selectively permeable materials on the substrate and gas diffusion mats, sealed to the substrate and sealed to the battery case for diffusing gas through the perforation in the battery case.

24. The membrane of claim 1, wherein the membrane is formed by coating and plugging pores of substrate, etched nuclear particle track dielectric films with selectively permeable materials, and further comprising gas diffusion mats sealed to the membrane and to the battery case for diffusing gas through a vent hole in the battery case.

25. The membrane of claim 1, wherein the membrane further comprises a pressure relief valve.

26. The membrane of claim 1, wherein the membrane forms a pressure relief valve or burst foil.

27. A battery vent comprising a battery case having at least one opening and a gas selective permeable catalytically active gas recombination membrane secured over the opening in the battery case for venting batteries.

28. A gas vent for batteries, comprising a sealed battery container, a perforation in the sealed battery container, a gas selective permeable catalytically active membrane vent and gas recombination mechanism for batteries, integral with a porous substrate and covering the perforation in the sealed battery container and a perimeter seal extending at least partially around the membrane, and sealing at least a peripheral portion of the membrane vent to the battery container around the perforation.